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Experimental culture of algal balls (Cladophora sauteri). Retention of original shape.

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Translated by K. TAKAIRA.

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EXPERIMENTAL CULTURE OF ALGAL BALLS (CLADOPHORA SAUTERI).

RETENTION OF ORIGINAL SHAPE

By K. Yoshida, The Municipal Suma Aquarium, Kobe.

It was on July 1st 1960 when 10 algal balls were acquired for exhibition at Suma Aquarium, Kobe. Permission to remove the specimens from the lake Akan Reserve was given by the National Nature Reserve Committee.

Algal balls, as a rule, lose their natural beauty when they are kept in an ordinary tank for a certain length of time and the exhibition of unshapely algal balls at the Aquarium might give a wrong impression to the visiting public. In an effort to retain the natural beauty it was decided to exhibit them in culture.

The spherical form of algal balls is believed to be the effect of the flow of water in which they grow. Six out of the ten algal balls acquired - 3 at 10cm., 2 at 6cm. and 1 at 5cm. in diameter - were cultured in circulating water in a culture container of hard vinyl chloride, (a box of 35 x 30 x 45cm.) and the remaining 4 in still water.

In view of the temperature factors of the Aquarium and the Lake Akan the culture box was suspended inside a temperature controlled (16°C/19°C) rainbow trout tank for the temperature-rising season of mid-May to November but no special consideration was given as to the light and the nutrition.

The water in the container was kept in circulation by means of an aeration pipe which was fitted at the bottom of the container and the speed of the water was adjusted by regulating the pressure of the compressed air. With this arrangement the rotation of the algal balls was counted at 560 rotations per hour for the 10cm. sized and 890 per hour for the 6cm. sized.

By the time the culture commenced (1st December 1960) all the algal balls had had overgrowth in the protonema to some extent. They were taken out of the culture on the 192nd day (10th June 1961) for comparison with those cultured in still water. The comparison is shown in Fig.2, p.25.

Those cultured in the circulating water cannot be regarded as retaining the 9riginal beauty in every respect and the colour had faded to some extent although the shape was somehow retained. The comparison of the point cellutes (=cells?) of small branches is shown in Figs. 3 and 4, pp. 25 and 26.

The point cellutes (=cells?) of protonema are rather irregular in length and those of the balls cultured in circulating water are distinctly shorter than those cultured in still water. There is no significant difference in the thickness.

As Y. Sakai points out in his paper (5) "the algal balls present themselves in the form of loosened ball with protruding the overgrowth of hairy protonema if tank culture prolongs" the still water cultures resemble the loose algal balls which grow in the deep and quiet water of the Lake Akan.

As the effect of the circulating water on the shortness of the cells and the tendency of ramification of the branchlets of the algal balls cultured resembles the characteristics of the cells of the branchlets of protonema typical of the velvety and radial algal balls (the derivation of) which has been described by Y. Sakai and Y. Yamada (6) as "in the protonema which forms the outer layer of velvety and radial algal balls the branches and their ramifications are short and twisted in comparison with those of free grown protonema of loose algal balls". And on account of unevenness in the length of the branchlets the outer layer surface of those cultured in circulating water is rugged.

According to "Experiment on spherical formation of algal ball" by Y. Yamada and Y. Sakai (6) as a result of two years and eight months culture in circulating water some of the lawn (=flat?) shaped algae had formed spherical shape and the shape was maintained although rugged on the surface. The algae can form spherical shape if they are kept turning round at the speed of 500-900 rotations per hour in culture.

The results of the experiment at the Aquarium coincide with Sakai's Report.

Serious consideration has to be given as to the intensity of light, the sunlight, the water temperature and the nutrition for algal balls in culture in order to retain the natural beauty and shape.

The acquisition of the algal balls was only for the purpose of exhibition and no dismemberment has taken place in the experiment.

I would like to express my gratitude to Professor H. Hirose, Kobe University for his advice and most useful reference to the literature on the subject and to Mr. K. Inoue and his staff for their untiring co-operation without which the experiment could not have been conducted.

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Fig.1, p.24. Algal balls in culture. The Container is suspended inside the temperature-controlled trout tank.

Fig.2, p.25.
A. Algal ball cultured in circulating water. 6cm diam. x5/8.
B. Algal ball cultured in still water. 7.4cm diam. x5/8.

Fig.3, p.25. Comparative Table of the point cellutes (=cells?) of protonema.

	Length (μ)	Thickness (μ)	External Form
Cultured in circulating water	559 ± 65	52.4 ± 2.8	Uneven
Cultured in still water	2,064 ± 157	50.4 ± 1.3	Even

Fig.4. p.25.
A. Protonema points. Cultured in circulating water x20.

B. Protonema points. Cultured in still water. x20.

Notice

Please note that these translations were produced to assist the scientific staff of the FBA (Freshwater Biological Association) in their research. These translations were done by scientific staff with relevant language skills and not by professional translators.